

The statutes of the council exclude members of "enemy" countries from every "international" union formed under its auspices until 1931. After that date the statutes may be amended, but only by a two-thirds majority; and amendment is not within the competence of any particular union concerned. "Once an international union is established," says Sir Arthur Schuster, "it become autonomous" except "in a few matters in which a common policy is desirable." He might perhaps have added that these "few matters" include the one and only matter about which there is any difference of opinion; and that, so far as co-operation with "enemy" countries is concerned, any science which consents to form a union loses its autonomy completely. Einstein may attend a congress of physics after 1931 if more than two-thirds, not of the physicists of the world, but of the members of the council, consider it advisable to allow him.

I have some experience of the working of the statutes myself, for I was a member of the committee appointed to consider the formation of a Union of Mathematics. When this committee met I moved, on behalf of the society of which I was a representative, that it was desirable "that any union which should be formed should be thrown open to the mathematicians of all nations at the earliest practicable opportunity." This resolution was rejected, not on the ground that it did not represent the general opinion of mathematicians (as beyond doubt it did), but on the ground that it conflicted with the statutes of the council.

The object of this council is not to promote international co-operation, but to exclude the Germans from it. I do not know who wrote the article in the *Times* of which Sir Arthur Schuster complains, nor have I any direct information as to the decisions of English biologists; but if indeed they have refused to join on the ground that the formation of a union "would perpetuate differences which should be left to time to heal," then they deserve the thanks of every English man of science; and so, too, does the correspondent of the *Times*, who has blurted out what so many of us have been feeling and so few have had the courage or the energy to say.

G. H. HARDY.

New College, Oxford, March 21.

Solar Radiation in Relation to Faculae.

In my letter published in *NATURE* of January 13, p. 630, it was suggested that the apparent relation between increased solar radiation and sun-spots was due to outbursts of heated gases accompanying the spots. This conclusion seems confirmed by later observations furnished from the Observatory of La Plata by Mr. Bernhard H. Dawson.

Since September there have been eleven cases in which outbursts of faculae were observed on the east edge of the sun, and eight in which they were observed on the west edge. The accompanying table shows the mean values of solar radiation preceding and following the appearance of these faculae. Zero day indicates the day of observation and the numbers are the amounts exceeding 1,900 calories per sq. cm. per minute.

Faculae on East Limb of Sun.

	Before	Days after													
	1	0	1	2	3	4	5	6	7	8	9	10	11	12	13
Solar radiation	38	60	42	38	52	49	49	54	49	50	50	44	56	60	51

Faculae on West Limb of Sun.

	Days before														After
	13	12	11	10	9	8	7	6	5	4	3	2	1	0	1
Solar radiation	58	44	56	58	49	56	56	55	48	51	46	54	62	—	47

NO. 2682, VOL. 107]

These results show a marked maximum of solar radiation on the day of observation whether the faculae were on the east limb or the west limb. After their appearance on the east limb there was a second maximum twelve days later, and there was also a maximum ten to eleven days preceding the observation of faculae on the west limb.

The results are plotted in the accompanying diagram (Fig. 1). It would seem from these results

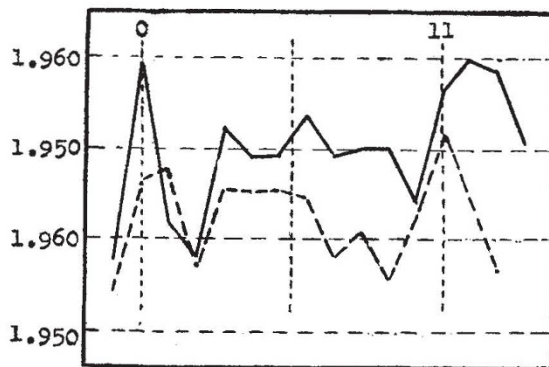


FIG. 1.

that outbreaks of heated gases on the edge of the sun result in increasing the effective radiative surface of the sun, and thus intensify the solar radiation.

H. H. CLAYTON.

Buenos Aires, February 19.

The Sound of Distant Gun-fire.

FATHER SCHAFFERS's letter in *NATURE* of March 10 on the audibility of gun-fire sounds when travelling through air prompts me to ask if observations have ever been made upon such sound-waves when passing through the earth's crust. In 1917 I commenced to dig gravel in my garden here. The pit finally reached a depth of 12 ft., and was about 7 ft. long by 6 ft. wide. When I had reached a depth of about 6 ft., and from that point downwards, I constantly heard the sounds of gun-fire, while at the surface they were quite inaudible. The digging out of gravel was carried on at intervals during a period of many months, and I must have heard the sounds dozens of times.

C. CARUS-WILSON.

Strawberry Hill.

MANY observations similar to the interesting one recorded by Mr. Carus-Wilson were made during the war. The sounds of gun-fire were heard plainly in excavations, though they were inaudible on the ground above. They were even heard by persons lying with their heads on the ground, but not when sitting up. Mallet remarks that the noise of the firing at the Battle of Jena in 1806 was heard as a low murmur in the fields about Dresden, at a distance of 92 miles, but he adds that "it is almost certain that in this case the noise was transmitted through the earth" (*Brit. Assoc. Rep.*, 1851, p. 283). Grouchy and his officers at Sart-les-Walhain are said to have heard the firing at Waterloo. They "placed their ears to the ground and thus detected plainly the muffled boom of distant guns."

CHARLES DAVISON.

"Dunster," Cavendish Avenue,
Cambridge.